

# Hypothesis of Atypical Reaction to Stimulants in Attention Deficit Disorder

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## Introduction

Although it is understood that sufferers of Attention Deficit Disorder experience drowsiness rather than alertness as a result of the ingestion of caffeine and other agonists of the production of choline compounds, the underlying reason is not understood.

## Abstract

In a healthy human brain, the introduction of a chemical such as caffeine results in an increase in the serum levels of neurotransmitters including dopamine and acetylcholine. This increase is uniform through various tissues and the production rate of the neurotransmitters is steady, at least in the healthy brain.

I propose that it is the intermittent production of neurotransmitters in response to stimulants which results in the atypical drowsiness reported so often in sufferers of ADD and ADHD. In a brain suffering from ADD, neurotransmitters are released in bursts followed by periods of inappropriate dormancy. A consequence of this is that a desynchronization of communication between different brain regions (manifesting as differences in oscillatory frequency) is initiated which, as has been demonstrated to be the mode of action of sedatives such as propofol, results in drowsiness or even unconsciousness.

Fundamentally, this is indicative of ADD being the result of an insufficiency in the rate at which the release of neurotransmitters such as dopamine and/or cholines can be switched on and off. In this author's opinion, the problem is not metabolic i.e. the chemicals are manufactured in sufficient quantity, but the release mechanism is insufficiently responsive, resulting in neurotransmitters being released only when a high density of neurotransmitters accumulates near a cellular membrane. These unusually strong bursts of neurotransmitters may be responsible for the tendency of sensory inputs to cause distraction in the disorder.

We can observe cases in which alternating production of neurotransmitters induces drowsiness in the animal kingdom. Take, for example, the crab, which can notably be put to sleep by gently increasing and decreasing about twice per second the level of ambient lighting.

## Conclusion

By studying such phenomena in animals, we can better-understand disorders of the human brain such as ADD and ADHD.